OpenShift

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About Me

- Freelancing since 2000
- Linux-Trainer
  - From 2000 to 2008 primarily for Red Hat
    - #8 RHCA 2nd in Europe
- Author
  - Samba 3 – Wandere zwischen den Welten
- Administrator
  - Freelancing from 2000 – 2016
    - Deutsche Börse 2008-2016
- Since 2017
  - 10% Freelancing
  - 90% Employed Sysadmin @ Deutschen Börse AG, Frankfurt

Platform as a service

Truth

- There is no Cloud,
  only other peoples computer

- Container are not designed to be secure

RedHat Centos Fedora

- Upsteam – Downsteam

- Fedora
- RedHat
- Centos
- CoreOS

- All are 100% OpenSource
- Centos / Fedora are influenced by Red Hat
- Trademark owned by Red Hat

Container

- Normal processes, run in a contained way
  - chroot
  - namespaces
  - Capabilities
  - Cgroups
  - SELinux
- Filesystem Layers (empheral)
- Persistence data is a problem
- Should fix the „works for me“ problem.
- Container standard = OCI
- Missing: Handling large number of containers

History

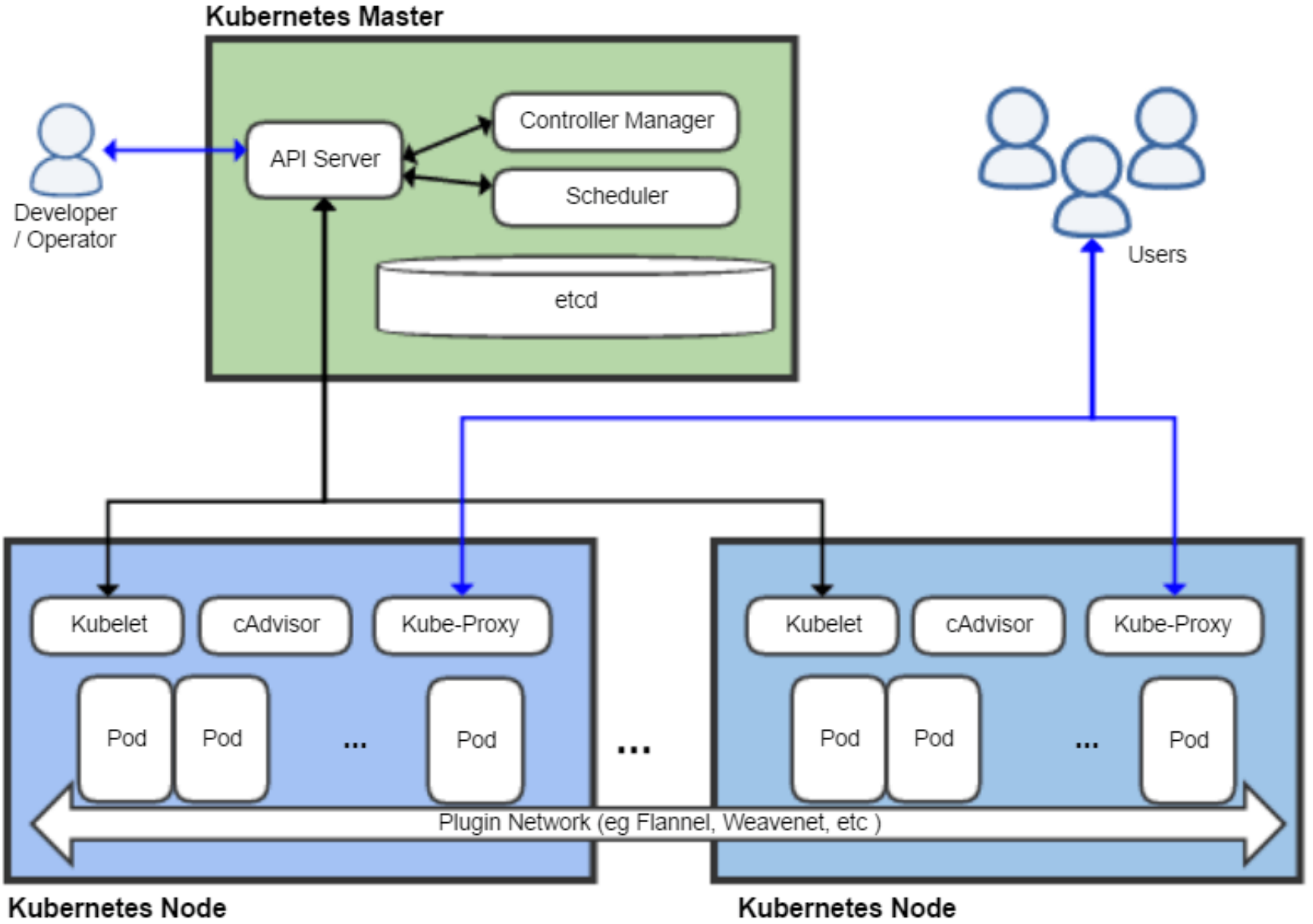
- **Container are not new**
- 1979 chroot syscall in Unix v7
- 1982 Chroot command in 4.2BSD
- 2000 Jails in FreeBSD (inkl. Extra IP)
- 2001 Vserver for Linux (FS,network,Mem)
- 2005 OpenVZ (+ resource mgmt, checkpoint)
- 2005 Zones in Solaris (+ Cloning)
- 2008 lxc in Linux (included in vanilla kernel)

Docker

- Created 2013
- New: Easy to use file system layers
- Only the best known container tool
- One big daemon, does everything, runs as root
- Will be replaced
  - by CRI-O or rkt
  - with a lot of single purpose tools (Unix Style).

Kubernetes

- Kubernetes is greek for Pilot or Helmsman
- Google used a tool called Borg, re-implemented with Codename Seven (nicer Borg), seven sticks on the wheel.
- Now Cloud Native Foundation (Linux Foundation)
- Used with Rancher Labs, Azure, CoreOS Tectonic, Mirantis, openshift, ...


Kubernetes Master
Developer
/ Operator
API Server
Controller Manager
Scheduler
etcd
Users
Kubelet
cAdvisor
Kube-Proxy
Pod
Pod
...
Pod
...
Kubelet
cAdvisor
Kube-Proxy
Pod
Pod
...
Pod
Plugin Network (eg Flannel, Weavenet, etc)
Kubernetes Node
Kubernetes Node

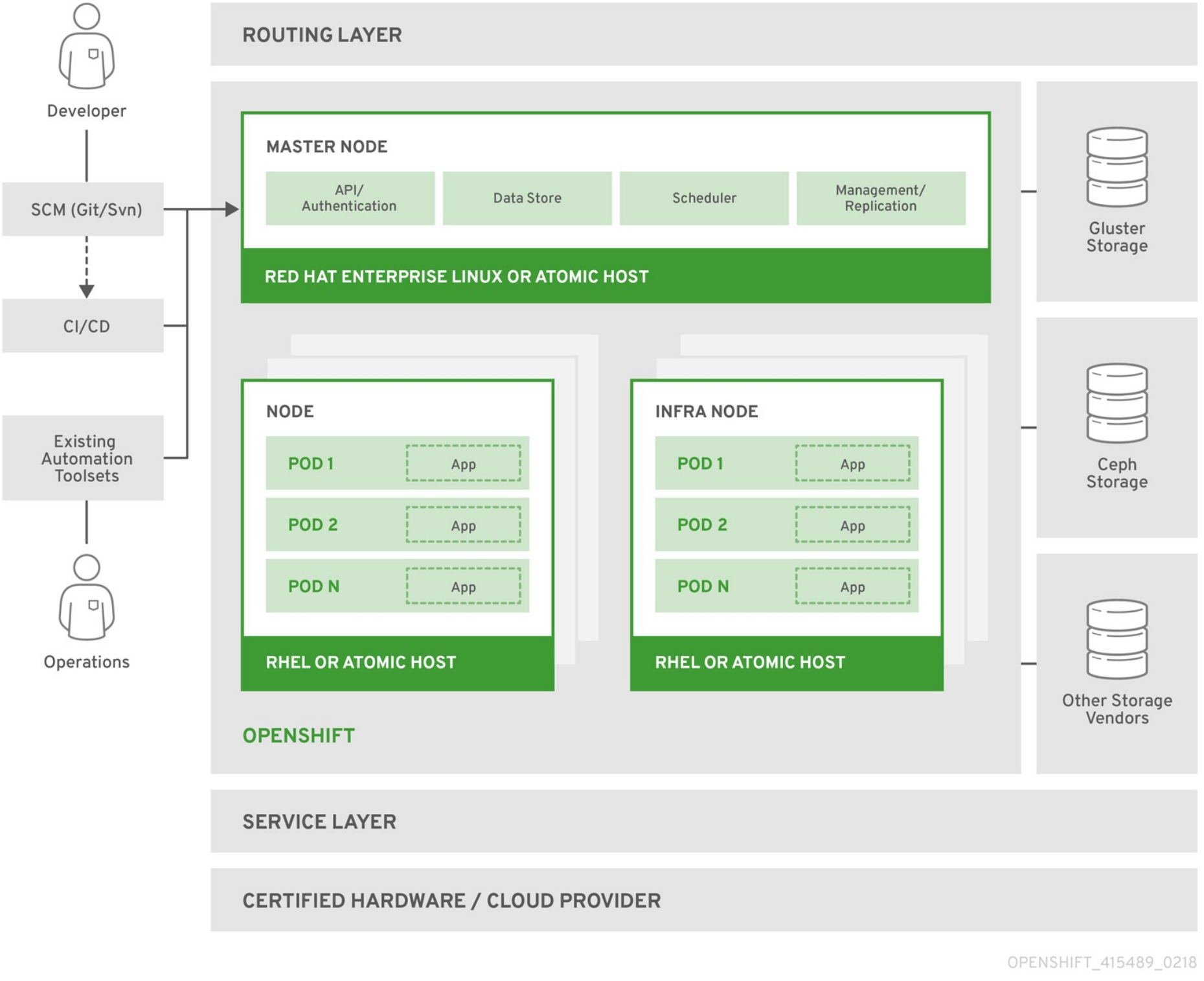
Kubernetes

- Pods (Running Conatiner)
- Nodes (Machine that runs Container)
- Project (multibe container, secluded)
- Controller Manager
- Master
- Etcd (from CoreOS)

- Readyness vs. Liveness Probe
- Missing: Network, Storage and a GUI

Openshift

- Editions
  - Origin (OpenSource upstream)
  - Dedicated (Private Instance on Public Cloud)
  - Container Platform (On Premise Privat Cloud, former OpenShift Enterprise)
  - Online (open public Cloud)
- Runs on
  - Bare-Metal
    - Latest Redhat, Centos or Fedora normal install
    - Or Atomic Host (Minimal Installaion with atomic updates)
    - Or Fedora CoreOS
  - Virtual Machines (KVM, VMWare, VirtualBox)
  - Public Clouds (AWS, Azure, OpenStack, Google Compute)
- Creates a platform independent layer


ROUTING LAYER
Developer
SCM (Git/Svn)
CI/CD
Existing Automation Toolsets
Operations
MASTER NODE
API/ Authentication
Data Store
Scheduler
Management/ Replication
RED HAT ENTERPRISE LINUX OR ATOMIC HOST
NODE
POD 1
App
POD 2
App
POD N
App
RHEL OR ATOMIC HOST
INFRA NODE
POD 1
App
POD 2
App
POD N
App
RHEL OR ATOMIC HOST
OPENSHIFT
Gluster Storage
Ceph Storage
Other Storage Vendors
SERVICE LAYER
CERTIFIED HARDWARE / CLOUD PROVIDER
OPENSHIFT_415489_0218

OpenShift

- Gluster (Cloud Native Storage)
- Monitoring/Logs integrated
- Network Layer (flanel)
- Extendable by addons

Node selections

- 1 Possible (Minishift)
- 4 = Master +3 Nodes
- Real Setups:
  - 3 Master (HA)
  - 3 Infrastructure Nodes
  - 3++ normal Nodes

DEMO Minishift

DEMO real Infrastructure

Problems of Container

- Where comes the Container from
- What is the configuration of the Container
- A lot of new concepts Hugh learning curve

Why Openshift?

- Can Creates complete Cloud Independence
- Based on OpenSource
- No Single point of Failure (Cross Cloud not possible yet ...)

Image Sources

- https://de.wikipedia.org/wiki/Datei:Kubernetes.png
- https://github.com/openshift/openshift-docs/blob/master/architecture/images/architecture_overview.png